UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

SILVOPASTURE ESTABLISHMENT
(Acres)

CODE 381

DEFINITION

An agroforestry application establishing a combination of trees and compatible forages on the same acreage.
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PURPOSES

- To provide forage for livestock in combination with production of forest products
- To increase carbon sequestration
- To combine profitability and improved cash flow in one system
- To enhance nutrient uptake
- To improve water quality
- To reduce erosion
- To enhance wildlife habitat
- To provide shade for livestock

CONDITIONS WHERE PRACTICE APPLIES

Situations where silvopasture establishment applies include: 1) pasture where trees or shrubs can be added; 2) forest where forages can be added; 3) land on which neither the desired trees nor forages exist in sufficient quantity to meet the land user's objectives.

This practice may be applied on any area that is suitable for the desired plants.

CRITERIA

Selected tree and forage species should be adapted to the site. Trees that have been used in successful silvopasture establishment in the Southeast include Longleaf pine, Slash pine, and Loblolly pine.

Forages that have been used in successful silvopastures in the Southeast include Bahiagrass, Tall fescue, and Bermudagrass. Other grasses, forbs, and tree species may be used which are adapted to the site and have desirable growth habit that will provide the type of forage needed and desirable forest products.

SITE PREPERATION

For existing pasture where trees will be added, site preparation should be based on existing vegetation and soil conditions. See Forest Site Preparation Standard 490.

For existing forests where forage will be established, site preparation should include:
1) Removing sufficient number of trees to allow adequate light penetration for forage crops.
2) Disking. If stumps interfere with equipment operation they should be allowed to decay before attempting to establish perennial forage crops.
3) Prescribed burning (pine only).

TREE PLANTING

Trees will be planted mechanically or by hand. See Tree and Shrub Planting Standard 612 for planting criteria.

Row arrangement should be single or double row configuration. Recommended spacing for silvopasture are shown in the following table.

SILVOPASTURE – TREES PER ACRE

SINGLE-ROW SET					*DOUBLE-ROW SET*							
ALLEY		tree to tree			tree to tree							
WIDTH		in row			in row							
		spacing			spacing			***ROW***	***SPACING***			
						6ft		**8ft**		**10ft**		**12ft**
15 FT		**8ft**	363		**8ft**							
		10ft	290		**10ft**			378		348		322
		6ft	363									
20 FT		**8ft**	272		**8ft**			388		363		340
		10ft	218		**10ft**	335		311		290		272
		6ft	242		**6ft**			382		363		345
30 FT		**8ft**	182		**8ft**	303		287		272		258
		10ft	145		**10ft**	242		229		218		207
		6ft	182		**6ft**	315		303		290		279
40 FT		**8ft**	136		**8ft**	237		227		218		209
		10ft	109		**10ft**	189		182		174		167

*Field shape and planting design may cause some variation in trees per acre.

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Additional Criteria to Provide Forage for Livestock and the Production of Forest Products

The forage species must be identified as suitable for the targeted livestock.

Livestock grazing shall be deferred until the average height of the tree's terminal bud exceeds the browsing height of the livestock or until trees are of sufficient size to resist breakage or until suitable use exclusion measures for the protection of the woody plants are established.

A forage crop (hay, silage, etc.) may be harvested during this period.

Plant trees at an appropriate density to allow acceptable forage production and wood products.

The tree or shrub species must have potential to produce forest products.

Additional Criteria to Increase Carbon Sequestration

For optimal carbon sequestration, select plants that have higher rates of sequestration and are adapted to the site to assure strong health and vigor.
Plant and manage the appropriate stocking rate for the site to maximize biomass production.

Additional Criteria to Improve Water Quality

Favor trees, shrubs and forages that have growth characteristics conducive to high nutrient uptake.

Additional Criteria to Reduce Erosion

Place linear woody plantings on or near the contour where water erosion is a concern.

Additional Criteria to Enhance Wildlife Habitat

Establish forage species that will provide forage, browse, seed, cover or nesting habitat for the wildlife species of concern. For additional guidance refer to Wildlife Upland Habitat Management Standard (645).

FORAGE ESTABLISHMENT FOR SILVOPASTURE

Establishment of forage species will be in accordance with Pasture and Hayland Planting Standard 512 or Range Planting Standard 550.

CONSIDERATIONS

Alternative use of forage crops (hay, silage, etc.) is desirable until average height of the terminal bud exceeds the browsing height of livestock. When grazed, a prescribed grazing plan must be followed (See NRCS Prescribed Grazing Standard 528). Failure to do this may result in excessive tree loss!

Location and distribution of facilities for water, minerals, or supplemental feed should be such that livestock are not encouraged to overutilize areas of silvopasture.

When using pesticides to facilitate establishment of trees or forage crops, follow label recommendations and NRCS Pest Management Standard 685.

PLANS AND SPECIFICATIONS

Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, narrative statements in the conservation plan or other acceptable documentation.

OPERATION AND MAINTENANCE

The following actions shall be carried out to ensure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance):

Forage and forest management will follow Prescribed Grazing (code 528) and Forest Stand Improvement (code 666) standards.

Replanting will be required when tree survival rate is less than 75%.

Periodic applications of nutrients may be needed for establishment and to maintain plant vigor. Refer to the conservation practice standard for Nutrient Management, code 590, for further guidance.

Inspect trees and shrubs periodically and protect from adverse impacts including insects, diseases or competing vegetation. The trees or shrubs will also be protected from wildfire and damage from livestock and wildlife.

Competing vegetation will be controlled until the trees are established. Nutrient management: Application of nutrients may be required for forage establishment. Refer to Nutrient Management Standard 590.

REFERENCES

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